

WHAT IS CLAIMED IS:

1. A method of determining whether an image of an eye is of a left eye or a right eye, the method comprising:
  - locating an iris center on the image;
  - locating a corneal vertex on the image; and
  - determining whether the image is of a left eye or a right eye, based on the location of the corneal vertex relative to the iris center.
2. A method as in claim 1, further comprising locating a center of a pupil of the eye on the image before locating the center of the iris.
3. A method as in claim 1, wherein locating the corneal vertex comprises locating at least one reflection on the image, wherein the at least one reflection is caused by illuminating the eye while acquiring the image.
4. A method as in claim 3, wherein determining whether the image is of a left eye or a right eye comprises assuming that the at least one reflection is displaced, relative to the iris center, toward a nose of a patient from whom the image was acquired.
5. A method as in claim 4, wherein determining further comprises:
  - measuring a displacement of the at least one reflection toward the nose, relative to the iris center; and
  - determining whether the image is of the left eye or the right eye, based on the measured displacement.
6. A method as in claim 4, wherein determining further comprises:
  - measuring a displacement of the at least one reflection toward the nose, relative to the iris center;
  - comparing the measured displacement with a predetermined threshold displacement; and
  - determining whether the image is of the left eye or the right eye only if the measured displacement is equal to or greater than the predetermined threshold.

7. A method as in claim 6, further comprising determining the predetermined threshold in response to a sub-population group of a patient having the eye.

8. A method as in claim 1, further comprising, before the locating steps: illuminating the eye; and obtaining the image of the eye.

9. A method as in claim 8, illuminating the eye comprises illuminating with at least one infrared light source.

10. A method as in claim 9, wherein illuminating the eye comprises illuminating a pupil of the eye with at least two infrared light emitting diodes disposed near an opening through which the image is acquired.

11. A method as in claim 8, wherein obtaining the image comprises imaging the eye using a wavefront imaging device.

12. A method as in claim 11, wherein obtaining the image comprises obtaining an image of a pupil of the eye.

13. A method as in claim 12, wherein illuminating the eye comprises illuminating the pupil using at least one infrared light source disposed near an opening through which the eye image is acquired.

14. A method as in claim 1, further comprising verifying that a correct eye has been selected on which to perform a laser eye surgery procedure, based on the determination of whether the image is of a left eye or a right eye.

15. A method as in claim 1, further comprising providing a warning to a user of a laser eye surgery system before the system is used to perform a laser eye surgery procedure on an incorrect eye, wherein the warning is based on the determination of whether the image is of a left eye or a right eye.

16. A method as in claim 1, further comprising performing a customized laser eye surgery procedure on the eye, based on the determination of whether the image is of a left eye or a right eye.

17. A method of determining whether an image of an eye is of a left eye or a right eye, the method comprising:

locating a pupil center on the image;

locating a corneal vertex on the image; and

determining whether the image is of a left eye or a right eye, based on the location of the corneal vertex relative to the pupil center.

18. A method as in claim 17, wherein locating the corneal vertex comprises locating at least one reflection on the image, wherein the at least one reflection is caused by illuminating the eye while acquiring the image.

19. A method as in claim 18, wherein determining whether the image is of a left eye or a right eye comprises assuming that the at least one reflection is displaced, relative to the pupil center, toward a nose of a patient from whom the image was acquired.

20. A method as in claim 19, wherein determining further comprises:  
measuring a displacement of the at least one reflection toward the nose,  
relative to the pupil center; and

determining whether the image is of the left eye or the right eye, based on the measured displacement.

21. A method as in claim 19, wherein determining further comprises:  
measuring a displacement of the at least one reflection toward the nose,  
relative to the pupil center;

comparing the measured displacement with a predetermined threshold displacement; and

determining whether the image is of the left eye or the right eye only if the measured displacement is equal to or greater than the predetermined threshold.

22. A method as in claim 21, further comprising determining the predetermined threshold in response to a sub-population group of a patient having the eye.

23. A method as in claim 17, further comprising, before the locating steps: illuminating the eye; and obtaining the image of the eye.

24. A method as in claim 23, illuminating the eye comprises illuminating with at least one infrared light source.

25. A method as in claim 24, wherein illuminating the eye comprises illuminating a pupil of the eye with at least two infrared light emitting diodes disposed near an opening through which the image is acquired.

26. A method as in claim 23, wherein obtaining the image comprises imaging the eye using a wavefront imaging device.

27. A method as in claim 26, wherein obtaining the image comprises obtaining an image of a pupil of the eye.

28. A method as in claim 27, wherein illuminating the eye comprises illuminating the pupil using at least one infrared light source disposed near an opening through which the eye image is acquired.

29. A method as in claim 17, further comprising verifying that a correct eye has been selected on which to perform a laser eye surgery procedure, based on the determination of whether the image is of a left eye or a right eye.

30. A method as in claim 17, further comprising providing a warning to a user of a laser eye surgery system before the system is used to perform a laser eye surgery procedure on an incorrect eye, wherein the warning is based on the determination of whether the image is of a left eye or a right eye.

31. A method as in claim 17, further comprising performing a customized laser eye surgery procedure on the eye, based on the determination of whether the image is of a left eye or a right eye.

32. A method of determining whether an image of an eye is of a left eye or a right eye, the method comprising:

locating an iris center on the image;

locating at least one reflection on the image, wherein the at least one reflection is caused by illuminating the eye while acquiring the image; and

determining whether the image is of a left eye or a right eye, based on the location of the at least one reflection relative to the iris center.

33. A method of performing laser eye surgery, the method comprising:

acquiring a wavefront measurement of an eye;

obtaining an image of the eye during the wavefront measurement;

generating a treatment for the eye based on the wavefront measurement;

determining whether the image is of a left eye or a right eye, based on nasally-directed displacement of a corneal vertex on the image relative to an iris center on the image; and

verifying that a correct eye has been selected on which to perform a laser eye surgery procedure, based on the determination of whether the image is of a left eye or a right eye.

34. A method as in claim 33, wherein determining whether the image of the eye is of a left eye or a right eye comprises:

locating the iris center on the image;

locating the corneal vertex on the image; and

comparing the location of the corneal vertex to the location of the iris center.

35. A method as in claim 34, wherein locating the corneal vertex comprises locating at least one reflection on the image, wherein the at least one reflection is caused by illuminating the eye while acquiring the image.

36. A method as in claim 35, wherein determining whether the image is of a left eye or a right eye comprises assuming that the at least one reflection is displaced, relative to the iris center, toward a nose of a patient from whom the image was acquired.

37. A method as in claim 36, wherein determining further comprises:  
measuring a displacement of the at least one reflection toward the nose, relative to the iris center; and  
determining whether the image is of the left eye or the right eye, based on the measured displacement.

38. A method as in claim 36, wherein determining further comprises:  
measuring a displacement of the at least one reflection toward the nose, relative to the iris center;  
comparing the measured displacement with a predetermined threshold displacement; and

determining whether the image is of the left eye or the right eye only if the measured displacement is equal to or greater than the predetermined threshold.

39. A method as in claim 34, further comprising locating a center of a pupil of the eye on the image before locating the iris center.

40. A method as in claim 33, further comprising illuminating the eye before obtaining the image of the eye.

41. A method as in claim 40, illuminating the eye comprises illuminating with at least one infrared light source.

42. A method as in claim 41, wherein illuminating the eye comprises illuminating a pupil of the eye with at least two infrared light emitting diodes disposed near an opening through which the image is acquired.

43. A method as in claim 33, wherein obtaining the image comprises imaging the eye using a wavefront imaging device.

44. A method as in claim 43, wherein obtaining the image comprises obtaining an image of a pupil of the eye.

45. A method as in claim 44, wherein illuminating the eye comprises illuminating the pupil using at least one infrared light source disposed near an opening through which the eye image is acquired.

46. A laser eye surgery system comprising:  
a laser emitting a beam of ablative light energy; and  
a computer processor configured to receive an image of an eye and at least one of a wavefront measurement and an ablation pattern for the eye, the computer processor having a computer program for determining whether the image is of a left eye or a right eye, based on a location of corneal vertex on the image relative to an iris center on the image,  
wherein the computer processor is configured to verify that a correct eye has been selected on which to perform a laser eye surgery procedure, based on the determination and on the wavefront measurement and/or ablation pattern.

47. A system as in claim 46, wherein the image of the eye comprises a pupil image taken during the wavefront measurement.

48. A system as in claim 46, wherein the computer processor is further configured to locate the iris center and the corneal vertex on the image of the eye.

49. A system as in claim 48, wherein the computer processor determines the location of the corneal vertex based on a location of at least one reflection on the image, wherein the at least one reflection is caused by illuminating the eye while acquiring the image.

50. A system as in claim 49, wherein the computer processor determines whether the image is of the left eye or the right eye by assuming that the at least one reflection is located closer than the iris center to a nose of a patient from whom the image was obtained.

51. A system as in claim 50, wherein the computer processor is further configured to measure a distance between the iris center and the at least one reflection.

52. A system as in claim 51, wherein the computer processor is further configured to compare the measured distance to a predetermined threshold distance and decide whether a left-eye/right-eye determination can be made, based on the comparison.

53. A system as in claim 46, further comprising at least one image acquisition device for obtaining the image.

54. A system as in claim 53, wherein the image acquisition device comprises a wavefront imaging device for imaging a pupil of the eye.

55. A system as in claim 53, wherein the wavefront imaging device includes at least one infrared light source disposed near an opening through which the pupil image is acquired.

56. A laser eye surgery system comprising:  
a laser emitting a beam of an ablative light energy;  
a light source directing light toward a corneal tissue of the eye;  
a microscope capturing an image of the illuminated corneal tissue; and  
a computer processor configured to direct a customized pattern of the ablative light energy toward the eye, the processor having a left/right eye identification module generating either a left eye signal or a right eye signal in response to the corneal tissue image.

57. A system as in claim 56, wherein the module generates an indeterminate eye signal when the corneal tissue image provides insufficient information for generating a left eye signal or a right eye signal.

58. A system as in claim 57, wherein the insufficient information comprises an amount of displacement of a corneal vertex location of the eye relative to an iris center of the eye, the amount of displacement being less than a predetermined threshold amount.

59. A system as in claim 56, wherein the processor verifies that a correct eye has been selected on which to perform a laser eye surgery procedure, based on the left eye or right eye signal and on at least one of a wavefront measurement and an ablation pattern for the eye.